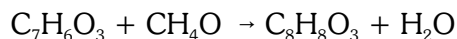


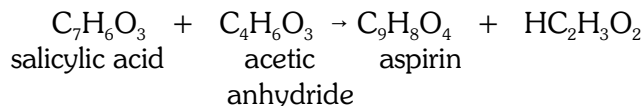
YIELDS IN CHEMICAL REACTIONS

1. Methyl salicylate, $C_8H_8O_3$, is the chemical responsible for the flavour of wintergreen. It can be prepared from salicylic acid, $C_7H_6O_3$, and methanol, CH_4O . If 2.00 g of the salicylic acid reacts with enough methanol:
 - a. What is the theoretical yield?
 - b. What is the percentage yield if 1.65 g of wintergreen is obtained after purification? (74.9%)



2. Aluminum metal reacts with liquid bromine to produce solid aluminum bromide as the only product.
 - a. Write the balanced equation. Don't forget which elements are diatomic molecules.
 - b. When 53.7 g of bromine react with enough aluminum, 48.4 g of the product is actually obtained. Determine the percentage yield. (81.0%)
3. Zinc reacts with hydrochloric acid through a single displacement reaction. Determine the percentage yield if 1.541 g of zinc chloride is produced when 0.999 g of hydrochloric acid reacts with enough zinc. (82.5%)

4. Aspirin is produced from salicylic acid and acetic anhydride as follows:



- a. What is the theoretical yield of aspirin if 213 g of salicylic acid reacts fully? (277.8 g)
 - b. What is the percentage yield if only 189.3 g of aspirin is produced? (68.1%)
5. Sulfuric acid is made in a three step process. The percentage yields for the three steps are 94%, 92.5%, and 97%.
 - a. What is the overall percentage yield? (84.3%)
 - b. How many kilograms of sulfur are needed to produce 200 kg of the acid? 77.55 kg